

# PERCEIVED IMPACTS OF TOURISM ACTIVITIES AND INFRASTRUCTURE DEVELOPMENT TO THE ENVIRONMENT AMONG TOURISTS AT REDANG ISLANDS

Murugadas A/L Ramdas @ Chelamuthu<sup>1</sup>, Ahmad Masduki Bin Selamat<sup>2</sup>, Jennifer Binti Sukor @ John<sup>3</sup>, Badaruddin Mohamed<sup>4</sup>

<sup>1</sup>Commerce Department, Politeknik Port Dickson, 71050 Port Dickson, Malaysia

<sup>2</sup>Director's Office, Politeknik Mukah, 96400 Mukah, Sarawak, Malaysia

<sup>3</sup>General Studies Department, Politeknik Mukah, 96400 Mukah, Sarawak, Malaysia

<sup>4</sup>School of Housing, Bilding and Planning, Universiti Sains Malaysia, 11800 Pulau Pinang, Malaysia

**ABSTRACT:** *Tourism has been proven to negatively impact the environment specifically the islands. This study looks into the tourists' perceived impact of tourism activities, development and infrastructure to the environment of Redang Islands. 211 questionnaires were distributed to tourists in Redang Islands which is a popular tourist island destination in Malaysia. The results indicate that there are significant numbers of moderate and high level of agreement that tourism activities and infrastructure development are affecting the island's environment. It was also found that foreign tourists had significantly higher level of agreement for both variables than local tourists. However, it was found that there was no significant difference among gender for both variables. Establishing carrying capacity and embedding environmental education in sustaining tourism management would help broaden the perception of tourists.*

**Keywords:** Tourist, Environment, Impact of Tourism Activities, Island

## 1. INTRODUCTION

The tourism industry has proven to be not only beneficiary toward the economic and social well-being but also contributes toward negative impacts towards a country [1-5]. Tourism activities have been identified to have a major negative impact towards the environment [6-7, 4, 8-11]. The impact of tourism activities towards the environment spreads in a variety of components. The components that are directly affected by tourism activities include ecological resources, natural sights, air, energy and water consumption, and natural resources [12, 2-4, 13-16].

The impacts from the tourism industry are being scrutinized in environmental summits. The Brundtland Commission (1987) highlighted the importance of sustaining the environment for the future generation in the midst of development. The Rio Summit [21] introduced a plan to mitigate the impacts known as the Local Agenda 21. The Local Agenda 21 mentioned that it is important to involve local community and tourists in sustaining environment. Post Local Agenda 21, there were 16 summits or meeting that mentioned the importance of developing tourism which is environmentally conscious.

There is also an indication that tourists' behaviour plays an important part in aggravating the impact on the environment. In contrast, it was also found that tourists showed concern towards the environment is to ensure the sustainability of natural activities [17]. However, there is no clear indication in recent studies whether the tourists have a clear perception towards the impact of tourism on the environment. Hence, the aim of the study would be to analyze perceived impacts of tourists towards tourism activities, development and infrastructure on the environment of Redang Islands. The specific objectives of this study would be to:-

i. The level of agreement of tourists on the impacts of tourism activities, development and infrastructure on the environment of Redang Islands.

ii. The difference in the level of agreement of tourists according to type of tourist and gender on the impacts of tourism activities, development and infrastructure Redang Islands.

The theoretical underpinning in regarding that is used in this in the social exchange theory. Based on this theory, the tourists enjoy the benefits of the tourism which included the beautiful experience and quality service. The direct tangible expenses involved are the expenses that occur during the visit. However, there are intangible expenses such as damage to the environment. The social exchange theory states that the benefit should exceed the expenses in order for destination to be a popular choice. This study aims the intangible expense which is the damage to the environment from the perception of the tourists.

## 2. PROPOSED RESEARCH

The main research method that was used is a quantitative design in the form of a survey. According to [18], a survey based on evaluation usually involves acquiring a desired or undesired result. In addition, the survey conducted in this research has two main purposes which are descriptive and explanatory [19]. The descriptive purpose of this study is to look at the level of agreement of the visitors and residents on the impacts of tourism on water quality. The explanatory purpose would be to look at the difference between the level of agreement of the visitors and residents.

The most common instrument used to collect data in a survey is by using a questionnaire. The questionnaire adapted from Mathieson and Wall (1982) was used in this study. The questionnaire consists of questions on all the physical impacts of tourism on the environment. A 5 point Likert scale was used to measure the level of agreement of the respondents. Location that was chosen for the study is Redang Island. This island was chosen as it is a popular island destination in Malaysia. Redang Island is believed to attract more than 8000

tourist per day during its peak season besides being recognized as one of the most beautiful island Peninsular Malaysia [29, 20].

A convenience sampling method was applied to distribute the questionnaire. Data obtained was analysed using SPSS. The data collection was done during the peak season (July to October 2012) of tourist to ensure more samples are available. The researcher distributed and gave some time for the respondent to fill in the questionnaire to avoid incomplete questionnaires. Data obtained was analysed using SPSS. A mean analysis was used to analyze the level of agreement of tourists. The level of agreement for descriptive analysis is analysed by dividing the distribution of the data into three equal percentiles. An independent sample t-test was conducted to analyse the difference of perception between tourists according to type of tourist and gender.

**3. FINDINGS**

The reliability of each item in the instruments was measured using the Cronbach’s Alpha Coefficient. The dimension of the questionnaire was calculated separately to facilitate clear understanding. The findings of reliability test were appended in the Table 1 for both of the variables.

**Table 1: Reliability Coefficients for Variables**

Variable	No. Of Items	Item Deleted	Cronbach Alpha
Tourism Activities and Development	18	-	0.929
Infrastructure Development	11	-	0.803

As a rule of thumb, values which were above 0.6 were considered acceptable and 0.8 is the most appropriate and acceptable stated by [20-22,29, 34]. Based on the table appended the variable that addressed in the questionnaire achieved reliability of 0.8 above to the fact that the items in the questionnaire are reliable.

Although convenience sampling was applied, the tourists varied in the types of tourists and gender. There were 136 (64.5%) local and 75 (35.5%) foreign tourists as respondents. From the samples, total number of 144 (68.2%) were male tourist and 67 (21.8%) were female tourists Vargas-Sanchez et al (2008) included perception of tourist as an important variable in the model of explaining attitude towards tourism impacts. A descriptive analysis would allow the researcher to analyse the perception of tourists.

**Table 2: Tourists Perception on Tourism Activities and Development Environmental Impacts**

Level	Frequency	%
Low (<3.61)	76	36.0
Moderate (3.62 – 3.89)	78	37.0
High (>3.90)	52	27.0

The level of tourists’ perception in Table 2 indicates that the total percentage of respondents with moderate and high level of agreement stands at 64%. This can be interpreted that a large number of tourists do agree that tourism activities and

development have a significant impact on the physical environment of the island.

**Table 3: Descriptive Analysis for Perceptions of Tourist on Tourism Activities and Development Environmental Impacts Items**

Items	Mean	SD	Level
Tourism activities (camping and hiking/forest recreation) has effects on plants.	3.87	0.882	Moderate
Tourism activities (hotels/chalet service premises and camping) contribute to compilation of solid waste in the island which affects the plants.	3.81	1.029	Moderate
Disposal of solid and liquid waste from tourism activities (hotel/chalet premises) effects the plants	3.90	0.886	Moderate
Tourism activities such as hiking/forest recreation and camping affect the surrounding land of the island.	3.62	0.894	Moderate
Development and tourism activities effects land’s fertility	3.51	0.938	Low
Tourism activities cause erosion to the rocks and beaches in the island.	3.48	1.006	Low
Land use for tourism development activities results in loss in forest areas (Deforestation).	3.72	0.928	Moderate
Land use for tourism development activities results loss in empty land.	3.76	0.936	Moderate
Improperly treated sewage wastes from tourism premises affect the environment.	3.99	0.884	Moderate
The environment of the island is effected by water-based activities.	3.84	0.905	Moderate
Living things in sea are affected by water pollution.	4.09	0.849	High
Smoke released by vehicles and open burning effect the health and environment.	3.92	0.925	Moderate
Poor air quality affects tourism activities.	3.84	0.905	Moderate
Natural landscape in the island has changed compared to before.	3.58	1.036	Moderate
Natural landscape should not be sacrificed to develop accommodation premises and infrastructures because there is no implication to the environment.	2.70	1.167	Low
Tourism development causes congestion and changes the environment which affects tourism.	3.59	1.002	Moderate
Tourism activities and physical development affects the habitat of the wildlife in the island.	3.73	0.979	Moderate

Biodiversity of living things are affected by tourism activities (fishing and hunting)	3.76	0.962	Moderate
--	------	-------	----------

Overall, Table 3 shows that 16 out 18 items (88.9%) are at moderate level. Meanwhile, only item on water pollution has a high level of agreement. Where else, item on natural landscape indicate a low level of agreement.

**Table 4: Level of Tourists Perception on Infrastructure Development Impact**

Level	Frequency	%
Low (<3.72)	68	32.2
Moderate (3.73 – 4.00)	28	13.3
High (>4.01)	115	54.5

The level of tourists’ perception in Table 4 indicates that the total percentage of respondents with moderate and high level of agreement stands at 67.8 %. This can interpreted that a large number tourists do agree that tourism infrastructure development have a significant impact on the environment of the island.

**Table 5: Descriptive Analysis for Perception of Tourist on Infrastructure Development Items**

Items	Mean	SD	Level
Accommodation premises development and other tourism structural development should be controlled and monitored by authorities for sustainable development.	4.06	0.840	High
Tourism development effects the environment.	3.98	0.771	Moderate
Improper material [glass] used for buildings will cause greenhouse effect [global warming] to the environment.	3.81	0.848	Low
Tourism affects the upgrading of public facilities.	3.93	0.756	Moderate
Improper sewage and solid waste management will affect the island’s tourism.	3.93	0.805	Moderate
Poor maintenance of public and tourist facilities will affect the island’s tourism industry	4.01	0.775	High
Rural and small towns benefit from tourist activities and development.	3.94	0.838	Moderate
Restoration and conservation is important for the sustainability of the island destination [recycling, turtle reproduction, beach cleaning etc]	4.19	0.757	High
Tourism development effects the natural and manmade landscape in this island	3.90	0.752	Moderate
Development activities have “disturbed” the natural environment.	3.64	0.987	Low
Tree cutting activities should not be done to build tourist/residence facilities	2.73	1.181	Low

Overall, Table 5 shows that 8 out 11 items (88.9%) are at a high and moderate level. Meanwhile, items on materials used for building, effects of development on natural environment and tree cutting activities obtained low level of agreement.

**Table 6: Difference in Perception Between Local and Foreign Tourists**

	Tourism Activities and Development	Infrastructure Development	
<b>Types of Tourist</b>			
Domestic	3.7823	3.9532	
Foreign	3.5933	3.6364	
Mean Difference	0.1889	0.2988	
Levene’s Test	F	0.157	0.550
	Sig	0.692	0.459
	EVA <sup>a</sup>	√	√
T-test	T	2.064	4.360
	Df	209	209
	Sig	0.040	0.000
	SD <sup>b</sup>	√	√

\*. Difference is significant at the 0.05 level [2-tailed];  
a: Equal Variance Assumption; b: Significant Difference

Table 6 shows the independent sample t-test analysis of the perception difference on variables between local and foreign tourists. The t-test indicates that there is significant difference between local and foreign tourists for both the variables. For both cases, foreign tourists have a higher level of agreement than local tourist.

**Table 7 : Difference in Perception Between Male and Female Tourists**

	Tourism Activities and Development	Infrastructure Development	
<b>Gender</b>			
Male	3.7207	3.8308	
Female	3.7032	3.8250	
Mean Difference	0.0175	0.0058	
Levene’s Test	F	2.014	7.427
	Sig	0.157	0.007
	EVA <sup>a</sup>	√	X
T-test	T	0.184	0.094
	Df	209	192.244
	Sig	0.854	0.937
	SD <sup>b</sup>	X	X

\*. Difference is significant at the 0.05 level [2-tailed];  
a: Equal Variance Assumption; b: Significant Difference

Table 7 shows the independent sample t-test analysis of the perception difference on variables between male and female tourists which indicates that there is no significant difference between male and female tourists for both the variables.

#### 4. CONCLUSIONS

The study derived from the various impacts that tourism activities has brought on the environment of islands. Tourist behaviour plays an important the aggravating the impact on the environment of islands. Past studies revealed that there was less focus in obtaining the perception of tourist on the impact brought on the environment. A survey using

questionnaire was conducted to elicit the perception of tourist on the impacts of tourism on environment. Redang Islands which is a popular island destination in Malaysia was chosen as the location of the study. From the results that were obtained, it can be concluded that tourists believe that tourism activities, development and infrastructure have a significant effect on the environment. This brings to the conclusion that the tourists are very much aware and concerned towards the effect of tourism on the environment.

As a recommendation, instilling tourists with environmental education could be a step to bring out positive actions. [22] believed that environmental education could be the bridge that helps to bring out a positive attitude from visitors towards the environment. Environmental education is also believed to bring out positive attitudes from residents as well [12]. Carrying capacity could become a standard indicator of an acceptable level for both visitors and residents. Carrying capacity in tourism is the maximum number or threshold value which can be accepted or accommodated by a tourist destination while maintaining visitor and residents satisfaction with reference to a standard of quality [2, 23]. Carrying capacity established in coastal areas would help to cope with environmental degradation.

## 5. REFERANCE

- [1] Mohamed, Badaruddin., Mat Som, Ahmad Puad., Jusoh, Jamil and Kong Yew Wong. "Island Tourism In Malaysia: The Not So Good News" 1212–1219(2003)
- [2] Bhattacharya, A.K. & Sankar, T., "Estimating the total carrying capacity of protected areas with respect to tourism activities - A case study of Bandhavgarh National Park, Madhya Pradesh, India", 1–10(2000)
- [3] Castellani, V., & Sala, S., "Sustainable performance index for tourism policy development". *Tourism Management*, **31**(6):871–880(2010).
- [4] Choi, H. C., & Sirakaya, E. "Sustainability indicators for managing community tourism". *Tourism Management*, **27**(6): 1274–1289(2005)
- [5] Gladstone, W., Curley, B., & Shokri, M. R., "Environmental impacts of tourism in the Gulf and the Red Sea". *Marine pollution bulletin*.(2012)
- [6] Arrow, K., Bolin, B., Costanza, R., Dasgupta, P., Folke, C., Holling, C. S., Jansson, B. O., et al., "Economic growth, carrying capacity, and the environment". *Science* (New York, N.Y.), **268**: 520–1(1995)
- [7] Buckley, R., "Sustainable tourism: Research and reality". *Annals of Tourism Research*, **39**(2):528–546(2012)
- [8] Holden, A., "The Environment-Tourism Nexus". *Annals of Tourism Research*, **36**(3):373–389(2009)
- [9] Kilipiris, F., & Zardava, S., "Developing Sustainable Tourism in a Changing Environment: Issues for the Tourism Enterprises (Travel Agencies and Hospitality Enterprises)". *Procedia - Social and Behavioral Sciences*, 44:44–52(2012)
- [10] Kostopoulou, S., & Kyritsis, I. (n.d.), *Anatolia : An International Journal of Tourism and A Tourism Carrying Capacity Indicator for Protected Areas*, 37–41(2012)
- [11] Silva, J. N., & Ghilardi-Lopes, N. P., "Indicators of the impacts of tourism on hard-bottom benthic communities of Ilha do Cardoso State Park (Canaanéia) and Sonho Beach (Itanhaém), two southern coastal areas of São Paulo State (Brazil)". *Ocean & Coastal Management*, **58**: 1–8(2012)
- [12] Arabatzis, G. and Grigoroudis, E., "Visitors' satisfaction, perceptions and gap analysis: The case of Dadia-Lefkimi-Soufliou National Park". *Forest Policy and Economics*, **12**:163–172(2010)
- [13] Lei, K., & Zhou, S., "Per capita resource consumption and resource carrying capacity: A comparison of the sustainability of 17 mainstream countries". *Energy Policy*, **42**:603–612(2012)
- [14] Kim, K., Uysal, M., & Sirgy, M. J., "How does tourism in a community impact the quality of life of community residents?" *Tourism Management*.(2012)
- [15] Song, H., Dwyer, L., Li, G., & Cao, Z., "Tourism economics research: A review and assessment". *Annals of Tourism Research*, **39**(3):1653–1682(2012)
- [16] Tang, Z., Shi, C. B., & Liu, Z., "Sustainable Development of Tourism Industry in China under the Low-carbon Economy". *Energy Procedia*, **5**:1303–1307(2011)
- [17] Lee K.T, & Othman, S. S., "Pertumbuhan dan Pelestarian Industri Eko-Pelancongan" *Kajian Pulau-pulau Peranginan Sekitar Pantai Timur Sabah*, **3**(2):273–294(2008)
- [18] Best, J.W & Kahn J.V., "Research in Education. New York : Prentice Hall" (1998)
- [19] Taylor, B., Sinha, G., & Ghoshal, T., "Research Methodolgy. New Delhi : Prentice Hall" (2006)
- [20] Jaafar, Mastura and Maideen, Siti Aishah., "Ecotourism-related products and activities, and the economic sustainability of small and medium island chalets". *Tourism Management*, **33**(3):683–691(2011)
- [21] Vargas-Sánchez, A., Porrás-Bueno, N., & Plaza-Mejía, M. D. L. Á., "Explaining residents' attitudes to tourism". *Annals of Tourism Research*, **38**(2):460–480(2011)
- [22] Ballantyne, R., Packer, J., & Sutherland, L. a., "Visitors' memories of wildlife tourism: Implications for the design of powerful interpretive experiences". *Tourism Management*, **32**(4):770–779)2011
- [23] Bimonte, S., & Punzo, L. F., "The evolutionary game between tourist and resident populations and Tourist Carrying Capacity". *International Journal of Technology and Globalisation*, **3**(1):73(2007)
- [24] Chin Loi Young., "Malaysia's Experience and Best Practices in Sustainable Ecotourism Malaysia Experience and Best Practices in"(2010)
- [25] Cross, G. H., Johnson, J. E., & Wood-arendt, A. E., "The Role Of Outreach Education In Achieving The Role Of Outreach Education In Achieving : UNEP" (2003)
- [26] Fisher, J. B., Nawaz, R., Fauzi, R., Nawaz, F., Said Md Sadek, E. S., Abd Latif, Z., & Blackett, M., "Balancing water, religion and tourism on Redang Island, Malaysia". *Environmental Research Letters*, **3**(2):024005(2008)

- [27] Jalal, K. C. a, Faizul, H. N. N., Naim, M. A., John, B. A., & Kamaruzzaman, B. Y., "Studies on water quality and pathogenic bacteria in coastal water Langkawi, Malaysia". *Journal of environmental biology / Academy of Environmental Biology, India*, **33**(4):831–5(2012)
- [28] Lee, C.-C., & Chang, C.-P., "Tourism development and economic growth: A closer look at panels". *Tourism Management*, **29**(1):180–192(2008)
- [29] Lim, H. S., Tan, F., MatJafri, M. Z., & Abdullah, K., "Water quality study using Oceansat imagery over Penang Island". *2011 IEEE International Conference on Imaging Systems and Techniques*, 65–69(2011)
- [30] Lozano-Oyola, M., Blancas, F. J., González, M., & Caballero, R., "Sustainable tourism indicators as planning tools in cultural destinations". *Ecological Indicators*, **18**:659–675(2012)
- [31] Malaysia: Economic Transformation Plan: 2010
- [32] Malaysia: New Economic Model:2010
- [33] Ministry of Science, Technology and Information. "The Public Awareness of Science and Technology". *Report : Percetakan Negara : Putrajaya*(2000)
- [34] Moayedi, H., Huat, B. B. K., Asadi, A., Kazemian, S., Ahmad, T., & Ali, M., "Groundwater quality assessment of Labuan Island", **6**(16):3943–3951(2011)
- [35] Schubert, S. F., Brida, J. G., & Risso, W. A., "The impacts of international tourism demand on economic growth of small economies dependent on tourism". *Tourism Management*, **32**(2):377–385(2011)
- [36] Simón, F. J. G., Narangajavana, Y., & Marqués, D. P., "Carrying capacity in the tourism industry: a case study of Hengistbury Head". *Tourism Management*, **25**(2):275–283(2004)
- [37] Teh, L., & Cabanban, A. S., "Planning for sustainable tourism in southern Pulau Banggi: an assessment of biophysical conditions and their implications for future tourism development". *Journal of environmental management*, **85**(4):999–1008(2007)
- [38] Torres-Delgado, A., & López Palomeque, F., "The growth and spread of the concept of sustainable tourism: The contribution of institutional initiatives to tourism policy". *Tourism Management Perspectives*, **4**:1–10(2012)
- [39] UNWTO (2012). Turning One billion Tourists into One billion.